

lying only as far south of the equator as York is north of it, South Georgia is covered, in the higher parts at least, with permanent snows and glaciers, and is altogether of a most wild and desolate aspect. Large masses of ice were continually breaking off from the perpendicular cliffs and falling into the sea with a noise like cannon. "The inner parts of the country," says Cook, "were not less savage and horrible. The wild rocks raised their lofty summits till they were lost in the clouds, and the valleys lay covered with everlasting snow. Not a tree was to be seen, nor a shrub even big enough to make a toothpick. The only vegetation we met with was a coarse strong-bladed grass growing in tufts, wild burnet, and a plant like moss, which sprung from the rocks."

Animal life, however, was more abundant. Seals were plentiful, and the penguins the largest ever seen by Cook; some which were taken on board weighed from twenty-nine to thirty-eight pounds. Eight kinds of "oceanic birds" are enumerated, and one, a yellow bird, was found to be delicious food. All the land birds observed were "a few small larks." From Cook's narrative it appears that Forster, the botanist, was one of the landing party, hence it might have been expected that few flowering plants would have escaped observation, especially as the visit was made in January, the midsummer of the southern hemisphere. Forster himself states ("Observations made during a Voyage round the World," p. 16) that South Georgia is an isle of about eighty leagues in extent, consisting of high hills, none of which were free from snow in the middle of January, except a few rocks near the sea. And he adds that there was no soil except in a few crevices of the rocks.

No further information respecting this island has been published, so far as I am aware, until since the return of a recent German Expedition, which made the island one of its stations for meteorological and other observations. When collecting the materials to illustrate the flora of the very much broken coldest southern zone of vegetation for the "Botany of the *Challenger* Expedition," I had to be content with Cook and Forster's very meagre accounts of South Georgia; but from the published northern limits of drift ice in different longitudes in the southern hemisphere, it was not expected that South Georgia possessed much more than the scanty flora they attributed to it, though Macquarie Island, in the same latitude, and nearly in the longitude of New Zealand, was known to support a comparatively luxuriant vegetation. Dreary and barren as it is, however, South Georgia is not so bad as it has been painted. The officers of the German Expedition spent nearly a year on the island, and appear to have explored it thoroughly, botanically and otherwise. During this period the atmospheric pressure was subject to extraordinary fluctuations, the extremes exhibiting a difference of 64 millimetres, or a fraction over $2\frac{1}{2}$ inches, while the range of temperature during the same period was only $48^{\circ}\cdot6$ Fahr., or in round numbers, from 8° to 57° Fahr.; thus showing the freezing-point to be nearly midway in the range. The actual mean temperature of the year was $35^{\circ}\cdot06$ Fahr.; of June, the coldest month, $25^{\circ}\cdot6$ Fahr.; and of February, the warmest month, $41^{\circ}\cdot6$ Fahr.

With regard to the flowering plants collected in the island by Dr. Will, one of the officers of the Expedition, we are indebted to Dr. Engler for an enumeration of them in his *Fahrbücher*, vol. vii. p. 281. They are thirteen in number, and their general distribution is so extremely interesting that I may be pardoned for giving it in detail:—

(1) *Ranunculus biternatus*, Sm. (Ranunculaceæ).—Fuegia, Falklands, Tristan d'Acunha (?) Marion, and Kerguelen Islands.

(2) *Colobanthus subulatus*, d'Urville (Caryophyllaceæ).—Fuegia, Campbell's Island, New Zealand, and Alps of Victoria, Australia.

(3) *Colobanthus crassifolius*, d'Urville (Caryophyllaceæ).—Fuegia and Falklands.

(4) *Montia fontana*, L. (Portulacæ).—Fuegia, Marion, Kerguelen, Campbell's Island, and widely diffused.

(5) *Acena adscendens*, Vahl. (Rosaceæ).—Fuegia, Marion, Crozets, Kerguelen, Macquarie Islands, and New Zealand.

(6) *Acena lævigata*, Ait. (Rosaceæ).—Fuegia.

(7) *Callitriche verna*, L. var. (Haloragæ).—Fuegia, Marion, Kerguelen, Heard Islands, New Zealand, and widely diffused.

(8) *Juncus novæ-zealandiæ*, Hook. f. (Juncaceæ).—New Zealand.

(9) *Rostkovia magellanica*, Hook. f. (Juncaceæ).—Andes, Fuegia, Falklands, and Campbell's Islands.

(10) *Aira antarctica*, Hook. f. (Gramineæ).—Fuegia, Falklands, South Shetlands, and Kerguelen Island.

(11) *Phleum alpinum*, L. (Gramineæ).—Magellan's Straits, and widely dispersed in the cold regions of the northern hemisphere.

(12) *Festuca erecta*, D'Urville (Gramineæ).—Fuegia, Falklands, and Kerguelen.

(13) *Poa flabellata*, Hook. f., syn. *Dactylis cæspitosa*, Forst. (Gramineæ).—Fuegia and Falklands.

From the collector's remarks, appended by Engler to each species, it appears that some of the foregoing plants flourish luxuriantly in South Georgia, especially the species of *Acena* (the burnet of Cook's narrative), and *Aira antarctica* and *Poa flabellata*. The *Ranunculus* was abundant by the side of a stream and elsewhere, and *Colobanthus subulatus* (doubtless the moss-like plant mentioned by Cook) formed large tufts on the south side of the hills. Nine out of the thirteen plants in South Georgia are also found in the eastern part of this southernmost zone of vegetation from Kerguelen to New Zealand, taking these islands together. One, *Juncus novæ-zealandiæ*, had not previously been found in what may be termed the American part of the zone; but, as Prof. Buchanan, to whom Dr. Engler submitted the South Georgian specimens, remarks, this is so nearly allied to the South American *Juncus stipulatus* that it may be cited as another instance of representative and closely-allied species in the American and Australian regions.

Thus are we gradually obtaining a knowledge of the vegetation of the detached fragments of the Antarctic flora; yet several islands are still quite unknown botanically or only very imperfectly. Concerning Diego Alvarez, or Gough Island, situated about 4° south of the Tristan d'Acunha group, we know nothing except that the vegetation is said to be similar to that of Tristan d'Acunha, and to include *Phyllica nitida*, the only arborescent member of the latter flora. Then there is a group of islands, including Lindsay, Bouvet, and Thomson, in about the same latitude as South Georgia, but 35° eastward, of which nothing is known botanically.

W. BOTTING HEMSLEY

NOTES

THE Visitation of Greenwich Observatory takes place on Saturday next.

THE Ladies' *Soirée* at the Royal Society takes place on the evening of Wednesday, the 9th inst.

THE honour of C.M.G. has been conferred on Mr. Charles Meldrum, Director of the Royal Alfred Observatory, Mauritius.

THE explosion of the 43-ton gun has led to the appointment of a Committee of Inquiry, in which the name of Mr. Anderson is conspicuous by its absence, although surely no greater authority on the points at issue exists. A year ago, in his important lectures at the Society of Arts, he drew attention to the want of relation between the sections and pressures, and predicted disasters.

SIR BERNHARD SAMUELSON, M.P., and Mr. Philip Magnus, of the City Guilds of London Institute, have been appointed by the Education Department English representatives at the International Congress on Technical Education, to be held at Bordeaux in September next.

PROF. FLOWER, the Director of the Natural History Department of the British Museum, has allowed the zoological collections made by Brigade-Surgeon J. E. T. Aitchison, C.I.E., the naturalist lately attached to the Afghan Delimitation Commission, to be placed on view temporarily at the South Kensington Department. To those interested in the zoology of those regions and in the geographical range of species, a view of these collections in their entirety will be found most interesting. We believe that at an early date this collection will be broken up to be sent to India, and distributed to various museums and countries, and that it is only localised here until such time as a report on its details is furnished to the Government of India.

MR. NICHOLSON has been appointed Curator of Kew Gardens, in the room of Mr. Smith, resigned. Mr. Nicholson has been one of the chief assistants at the Gardens for some years.

A SERIES of Conferences on the "Mineral Resources of the Colonies and India" will be held by the Geologists' Association in the Colonial and Indian Exhibition on Saturday afternoons, commencing at 3 p.m. After the reading of the paper there will be a discussion, terminating at 4.30. The Conference will then adjourn to the Courts, where further explanations of the exhibits will be given. The first meeting will be on Saturday next, when an address will be given on the Mineral Resources of India and Burmah, by Prof. V. Ball, F.R.S.; Sir Richard Temple will preside. The arrangements for succeeding Saturdays are as follow:—June 19, South Africa, by Prof. T. R. Jones, F.R.S.; Sir Ch. Mills in the chair. July 3, Canada, by Dr. A. R. Selwyn; the Marquis of Lorne in the chair. July 17, New Zealand, by Dr. J. Von Haast. July 24, Australia, by Mr. F. W. Rudler. There will probably also be a lecture by the President of the Geologists' Association (Mr. W. Topley), on the Coaling Stations in Relation to the Fuel Deposits of the Empire; but the date of this is not yet fixed. Conferences of the Anthropological Institute on the Races of the British Empire will also be held in the Conference Hall of the Colonial and Indian Exhibition. The first was on Tuesday on the Races of Africa. The others are:—Monday, June 7: Races of America (West Indies). Tuesday, June 22: Races of Australia. Tuesday, June 29: Races of New Zealand, Fiji. Tuesday, July 6: Races (Aboriginal) of India. Tuesday, July 13: Races of Ceylon, Straits Settlements, Borneo. The chair will be taken at 4 p.m. The memoirs read and discussed in the Conference Hall will be illustrated by selections from the exhibits. Afterwards, but not later than 5 o'clock, the Conference will adjourn to the Courts, and there inspect and hear explanations of the remaining exhibits connected with the subject of the day.

THE Lick Trustees have decided to purchase from Messrs. Feil and Mantois a 36-inch crown disk, which was made by them at the same time with the crown disk of the objective now in the hands of the Clarks. The Clarks "have received the order to figure this disk as a third (photographic) lens for the large objective."

A CURIOUS phenomenon, the *Scotsman* reports, was witnessed at Stonehaven on Sunday afternoon, May 23. At intervals, just before and after high tide, without any apparent cause, the water along the coast rose and fell from 10 to 18 inches at a time, the

subsidence leaving as much as 15 to 18 feet of the beach dry. The disturbance continued for three hours, commencing at about half-past 4 o'clock. There was no wind, and the sea was quite smooth, but the water advanced and retired with a speed equal to the run of a large river during a spate, and caused so much commotion in the harbour that the fishermen had to secure their boats with extra moorings to prevent damage being done. Indeed, it is seldom that there is so much commotion in the harbour, even during stormy weather. It is surmised that the phenomenon was due to some eruption or subsidence in the sea bottom.

THE Executive Committee of Aberdare Hall, Cardiff, has issued a most satisfactory report of the progress of Aberdare Hall during its first term. Seven students were entered when this Hall for lady students was opened in October 1885. Two of these are studying for the Intermediate Science Examination (London University), one for the Intermediate in Arts, and four for the Matriculation Examination. Two scholarships tenable at Aberdare Hall were awarded. At the beginning of the next session several large scholarships and many exhibitions will be offered for competition at University College, Cardiff, and three exhibitions tenable at Aberdare Hall. The institution deserves every encouragement.

THE New York Assembly has passed the Bill providing for the appropriation of 20,000 dollars annually to the Metropolitan Museum of Art and the American Museum of Natural History, in order that they may be kept open to the public, free of charge, on Sundays. It is expected that it will soon be favourably reported by the Senate Committee, and become law.

UP to Saturday morning the accounts from Catania were reassuring; the flow of lava was much slower and was rapidly cooling, and Nicolosi was considered almost safe. But at 4 p.m. a fresh outpour of lava manifested itself, and flowing over the earlier stream which had partially hardened, it again menaces Nicolosi and Belpasso. At 9.15 p.m., the lava stream which threatens Nicolosi showed a front 180 metres wide, from 6 to 10 metres high, and was moving at the rate of 10 metres per hour. According to latest reports the eruption is as active as ever.

ON April 28 a lovely mirage was seen at about noon at Östersund, in Northern Sweden. In the south-west, above the Storsjö, a great lake, the lofty Oviks Mountains, covered with snow, were seen reflected on the sunlit clouds. Below them was a dark broad belt of forest sloping down to an ice-covered lake, in which some woody islands could be seen. At the beginning the western sky was clear, but gradually a dark bank of clouds rolled up, at last obscuring the mirage, but it reappeared several times when the sun broke through.

MR. PENHALLOW, who has resided for some years in the service of the Japanese Government in Yezo, contributes to the last number of the *Canadian Record of Science* an article on the physical characteristics of the Ainos. Referring to the many contradictory reports as to the great hairiness of the Yezoines, his conclusion is that, although there are many exceptions, they generally possess a more than ordinarily hairy body, enough so at least to make them deserve the epithet of "hairy Kuriles." The bushy appearance of the hair and beard is doubtless due as much to the fact that the men never shave and seem rarely even to clip their beards, as to any natural excess of growth. The Aino of Saghalien offers a striking departure from the rule of hairiness which essentially characterises the Yezoine; and this would appear therefore not to be a race characteristic, but to be due to the peculiar and widely different conditions of life, dress, and exposure to which these people have been subjected. From

a considerable number of measurements, Mr. Penhallow summarises the physical characteristics of the Ainos as follows:—The forehead is usually high, though narrow; eyebrows heavy and overhanging; nose somewhat inclined to flatness, though but little more so than in Europeans; mouth wide, but well formed; chin well formed and medium size; eyes straight, brown, and dull; cheek-bones inclined to be prominent; facial angle high, the mean of the measurements giving an angle of 72° ; the body is compact, well built, and muscular; much more than ordinarily hairy, skin of light colour, comparable to that of Europeans, and the average height is about 5 feet 2 inches.

THAT frogs have a formidable enemy in the common mouse is evidenced by the following incident. A correspondent, Mr. W. August Carter, of South Norwood, states that he observed, a short time since, several mice pursuing some frogs in a shed which was overrun with these reptiles. The alacrity of the latter, however, rendered the attacks of the mice futile for a considerable period. Again and again the frogs escaped from the clutches of their foes, but only to be recaptured, severely shaken, and bitten. The energy put forth by these reptiles was so great that they actually swayed their captors to and fro in their efforts to wrest themselves from their grasp. At length the wounds inflicted upon them rendered the frogs incapable of further resistance, and they were easily overpowered by the mice, which devoured a certain part of them.

IN a lecture recently delivered before the Scientific Society of Bamberg, Dr. Hartwig, the Director of the new Astronomical Observatory there sketched out the future work of that institution. It was well, he said, that an observatory should devote itself to some speciality, with which its name would be associated, as that of Paris was with the determination and mapping of the fixed stars, Greenwich with the movements of the moon, Vienna with comets, and so on. In a similar way Bamberg would occupy a certain limited field, and labour therein. In the first place it would undertake the systematic investigation of the parallaxes of the fixed stars, a work which had already been partially performed at the Cape Observatory for the southern, and at Newhaven in the United States for the northern hemisphere. Bamberg will be provided with a new 7-inch heliometer, the largest of its kind at present in the world, although the Cape Observatory will shortly be provided with one of the same size. The present Cape heliometer is a 4-inch, and that at Newhaven a 6-inch one. Dr. Hartwig said that this 7-inch heliometer is at present the finest instrument known to astronomy. He pointed out that at present the parallaxes of only eight or ten fixed stars were calculated, while about three thousand remain to be done, and this, he said, would take a single qualified observer more than thirty years to accomplish. He hoped that as Leipzig and Göttingen were about to be provided with heliometers, they would participate in the work, so that in a comparatively short time we may obtain a more accurate notion of the distance of many fixed stars and of their grouping in space. Another work which Bamberg would undertake is the investigation of the physical libration of the moon—a problem that has been studied at Königsberg since 1845, and in Strasburg since 1870. After describing at some length the instruments with which the new Observatory is provided, Dr. Hartwig concluded by assuring his hearers that with these an observatory would be established which would take a high place amongst existing astronomical institutions, and which would be excelled in Germany by the Observatories of Strasburg and Potsdam alone. The Bamberg Observatory, it should be stated, owes its existence to the munificence of a private individual, the late Dr. Remeis, a member of the Scientific Society of Bamberg.

THE *Darling Downs Gazette* of March 20 describes some recently discovered caves fifteen miles from Rockhampton, Queensland. A party, headed by Mr. W. M'Ilwraith, of the Rockhampton Natural History Society, recently visited the caves. From some wells on the route they saw the peaks of an uncommon range of hills. "They stand up in a fine sharp profile like the pinnacles and turrets of a stately Gothic pile. The vestibule of the wonderful structure is formed by an immense chasm in the rocks. Two walls of limestone or marble rock set in an acute angle rise on either side to a height of about 60 feet, and converge in front at a higher elevation. At 9 o'clock at night the party began exploring, and after clambering over a mass of detached, sharp-edged, pock-pitted rocks, got into a rocky chamber. Its walls were beautifully white in parts, and show the rock to be of limestone formation. They visited in succession caves of different dimensions, and named one the 'Chinese Joss-house.' It is a little recess off the passage; the walls are beautifully white, and stalactites and stalagmites unite to form beautiful pillars, the whole being wonderfully beautiful, reminding the visitors of Chinese ivory carved work. In the morning they continued their exploration, wandering through numerous passages, and crawling and slipping till they came to a large cavern. In one of the passages the bats extinguished their candles, and they returned to the upper regions. They then saw daylight streaming from the opposite side of the mountain, and estimated the distance from light to light at five chains or more. They returned to the starting-point, climbed a ladder, and traversed other passages, and crossed a gulf on a bridge formed of saplings. Eventually they reached a wide opening, and the light poured in from an opening in the caves. This latter is a large chamber, and in it are the roots of a tree, which have taken hold in the bottom of the cave, and hang like ropes. The most striking stalagmites in it resemble the head of an elephant and the bust of a man. Various caves were discovered, and also openings leading from one main suite of caves to another one. The cave particularly alluded to is called 'The Cathedral.' It is 50 feet long from the porch to the pulpit stairs, 30 feet across, and the ceiling is so lofty that the gleams of the candle did not reach it. There are stalactitic formations on the ceilings and floor, but the walls are plain, and have niches in some parts. Some of the party descended 60 feet here, and in another failed to reach the opening. The writer says, 'Wherever we went almost underground our footsteps had a hollow sound, and the conclusion we come to at present is that the region has been a hot-spring area, and the caves were formed by the action of hot water.'

THE various species of Salmonidæ hatched out and reared by the Buckland Museum authorities have been turned into the Thames at Penton Hook, with a view of replenishing the stock of fish in that river. The Thames Angling Preservation Society are making arrangements to receive a consignment of land-locked salmon fry at their nursery again this year, in order to rear them for the Thames. The exertions now being made to re-stock the unpolluted portions of this river are sure to terminate in good results, indeed many of the trout taken lately are said to be the result of previous efforts made by pisciculturists in this direction.

ORNITHOLOGISTS, antiquarians, and librarians will in a few days have the opportunity of possessing a book which is said to be the only work published on the subject of duck decoys. It will be in quarto, with many illustrations, coloured and woodcut. Its author, Sir Ralph Payne-Gallwey, is already known to naturalists by his book on wild-fowl, issued some few years since by the publisher of the present volume, Mr. Van Voorst.

DR. VON HAAST writes that the large geological relief model of New Zealand, referred to in our recent article on the Colonial

and Indian Exhibition, has been prepared by Dr. James Hector, the Director of the Geological Survey of New Zealand, and forms part of the large exhibit of that gentleman. There are several large labels inside the glass case, in which the necessary explanations are given.

THE additions to the Zoological Society's Gardens during the past week include a Ring-tailed Lemur (*Lemur catta*) from Madagascar, presented by Mr. Angus Ogilvy; two Black-tailed Parrakeets (*Polytelis melanura*) from South Australia, presented by Mr. James Thomson; an Indian Cobra (*Naia tripudians*) from India, presented by Messrs. H. Thwaites and V. A. Julius; a Common Viper (*Vipera berus*), British, presented by Mr. W. H. B. Pain; a Loggerhead Turtle (*Thalassochelys caouana*) from the Atlantic Ocean, presented by Mr. R. G. Fraser, R.N.; a Rook (*Corvus frugilegus*), British, presented by Mr. H. J. Peckover; a Black-faced Spider Monkey (*Ateles ater*) from Eastern Peru, a Crab-eating Raccoon (*Procyon cancrivorus*) from West Indies; an Indian Cobra (*Naia tripudians*) from India, deposited; two Spotted Hyenas (*Hyæna crocuta*) from South Africa, two Side-striped Jackals (*Canis lateralis*) from West Africa, a Griffon Vulture (*Gyps fulvus*), a Smooth Snake (*Coronella levis*), a Viperine Snake (*Tropidonotus viprinus*), European, purchased; two Triangular Spotted Pigeons (*Columba guineæ*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN

A CATALOGUE OF "COMPARISON" STARS.—Dr. N. M. Kam of Schiedam has published in *Verhandelingen der Koninklijke Akademie van Wetenschappen*, Deel. xxiv. (Amsterdam), a star catalogue compiled from the places of stars determined by meridian observations, which have been extracted from vols. i. to lxvi. of the *Astronomische Nachrichten*, and reduced to the epoch 1855.0. The positions of the stars contained in this catalogue were determined in connection with observations of planets and comets, and it was in compliance with Argelander's express desire that the work of collecting them and reducing the positions to a common epoch was commenced by Hoek, then Director of the Utrecht Observatory. Dr. Kam, who was Hoek's assistant, continued the work after the death of the latter, and has at length been able to publish his results. The principal catalogue contains the completely determined places of 4350 stars, and is followed by two subsidiary catalogues, the first giving the places of 236 stars, and the second those of 335 stars; all of the latter, however, are incomplete, *i.e.* the place is given in one element only. The catalogues are followed by a comparison of the places of the stars contained in them with their places as given in the Bonn *Durchmusterung*, or, for stars south of -2° Decl., with other authorities. Notes on proper motions, corrigenda, &c., are appended, which are of considerable interest and value. We hope that the work of collecting and cataloguing the class of stars here dealt with will be continued either by Dr. Kam or by some other astronomer as well fitted for the task as he has proved himself to be.

THE PARIS OBSERVATORY.—Admiral Mouchez, Director of the Paris Observatory, has recently published his annual report to the Council of the Observatory. It is a very instructive and interesting document, and affords gratifying evidence of the enterprise and energy with which the work of this great institution is carried on.

The most striking portion of the report is that which deals with the work of the Bros. Henry in astronomical photography, but as this, as well as M. Loewy's ingenious device for determining the amount of astronomical refraction, have already been noticed in NATURE, it will not be necessary to again refer to them. Leaving these two great undertakings therefore on one side, the rest of the report exhibits a large amount of solid work. The meridian service has comprised 16,173 observations, 795 of the sun and planets. The instruments of the Salle Méridienne have been devoted to the observation of Lalande's stars. As the great Catalogue approaches completion, the stars still to be observed become more widely scattered, and fewer observations are necessarily secured. The division-errors of the Gambey circle are being carefully investigated by M. Périgaud, and the Garden circle has been used for the determination of the abso-

lute positions of a number of circumpolar stars. A new flexure apparatus has been constructed by M. Gautier, and 603 stars have been already observed with it. The same ingenious artist has also devised a new mode of supporting a mercury trough, for freeing it from the effect of tremors, which has been found to work very satisfactorily. The equatorials have been employed as usual in observations of comets, minor planets, and nebulae; the equatorial of the east tower having been employed by MM. Henry in the revision of some of their photographic charts containing very faint stars, especially the Pleiades and the regions round Vega and ϵ Lyrae. In the department of the calculations, the calculations for the great Catalogue had been completed as far as 8h. of R.A., and were being carried on from 8h. to 12h. The Catalogue itself was printed up to No. 3800, and the manuscript prepared up to No. 4700. Of the volume of observations for 1882, seventy-three sheets had been printed, and the rest was in the printer's hands. The volume for 1883 had been commenced, and of the *Mémoires*, tome xviii., had been distributed, and tome xix. was in course of publication.

Several important investigations have also been carried on by individual members of the staff. M. Loewy has devised a new method for determining the absolute co-ordinates of circumpolar stars, and M. Renan has published two notes on his experiments in application of these methods. M. Callandreau has published several notes on the theory of the figure of the planets and of the earth, and numerical tables for assisting in the calculation of ephemerides for minor planets; whilst M. Prosper Henry has been engaged in devising suitable methods for the measurement and reduction of the photographic star-charts, which differ so widely from ordinary astronomical observations. A new determination of the length of the seconds pendulum has also been made by Capt. Defforges, of the Geographical Service, the length corrected to sea-level being found to be 0.99394m. Amongst the works to be carried out in the present year is the study of the movements of the soil by the aid of a multiplying seismograph devised by M. Bouquet de la Grye. The report concludes with a reproduction of a photograph of the Pleiades and a comparison of the results thus obtained by photography in a single hour with those obtained by M. Wolf in his study of the same group through the toil of years.

NOTES ON VARIABLE STARS.—Mr. Espin, the special observer to the Liverpool Astronomical Society, has recently commenced the issue of circulars calling attention to various variable stars or stars suspected of variation. Circular No. 1 gives an ephemeris for 10 Sagittæ, the next maximum, mag. 5.6, falling due June 5.4d., and the next minimum, mag. 6.4, June 11.1, period 8.317d. Circular No. 2 calls attention to the star D.M. + 8°, No. 3780, R.A. (1885.0) 18h. 32m. 51s., Decl. $8^{\circ} 43' 5''$ N., as a probable variable. Circular No. 3 gives new elements for U Hydre, R.A. 10h. 31.9m., Decl. $12^{\circ} 40' 7''$ S., from whence it would appear that the next maximum is due 1886 June 25.5d. Circular No. 4 gives provisional elements for W. Cygni, R.A. (1886.0) 21h. 31m. 44s., Decl. $44^{\circ} 51' 0''$ N., as follows:— $P = 120$ to 130 days, $V = 5.8 \pm 0.7$, $M = 1886$ May 19 \pm , $m = 1886$ Feb. 14 \pm .

THE "CANALS" OF MARS.—M. Terby, in a note presented some little time ago to the Royal Academy of Belgium, drew attention to the occurrence in the drawings of Mars made by Herschel and Schröter of several markings resembling the well-known Kaiser Sea in size and distinctness, and pointed out that M. Schiaparelli, in his observations of 1881-82, represented the "canal" Indus as developed to dimensions almost as great as those of the Kaiser Sea, and that this development coincided with the "geminatio" or doubling of almost all the other canals. M. Faye now announces at the last meeting of the Académie des Sciences that M. Perrotin and the other observers at the Nice Observatory have recently been able to re-detect M. Schiaparelli's canals. The reality of the existence of the delicate markings discovered by the keen-sighted astronomer of Brera seems thus fully demonstrated, and it appears highly probable that they vary in shape and distinctness with the changes of the Martial seasons.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1886 JUNE 6-12

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)